WHAT IS CLAIMED IS:

1. A culturing method which provides for the production of avian PGC and germ (EG) cells comprising the following steps:

(i) isolating primordial germ cells from a desired avian; and

(ii) culturing said primordial germ cells in a culture medium containing at least the following growth factors contained in amounts sufficient to maintain said PGCs for prolonged periods in tissue culture:

(1) leukemia inhibitory factor (LIF),

(2) basic fibroblast growth factor (bFGF),

(3) stem cell factor (SCF) and

(4) insulin-like growth factor (IGF),

for prolonged time period sufficient to produce a culture having a compact multilayer like appearance;

(iii) identifying EG cells contained therein.

2. The method of Claim 1, wherein the minimal amounts of said growth factors are :

(1) LIF (0.00625 U/μl,

(2) bFGF (0.25 pg/μl),

(3) IGF (0.5625 pg/μl), and

(4) SCF (4.0 pg/μl).

3. The method of Claim 2, wherein the maximal amounts of said growth factors range from about two times to one hundred times said minimum amounts.

4. The method of Claim 1, wherein said avian PGCs are obtained from an avian of the genus *Gallinacea*.

5. The method of Claim 4, wherein said PGCs are chicken PGCs or turkey PGCs.

6. The method of Claim 1, wherein said PGCs are maintained in culture for at least 25 days.

7. The method according to Claim 6, wherein said PGCs are maintained in culture for longer than 25 days.

8. The method according to Claim 7, wherein said PGCs are maintained in culture for at least 4 months.

9. The method of Claim 1, wherein avian EG cells are identified based on their expression of mouse-stage specific antigen 1, and/or reactivity with EMA-1 or MC-480 monoclonal antibody.

10. The method of Claim 9, wherein the EG phenotype of said cells is further confirmed by transferral of such cells to a suitable avian embryo.

11. The method of Claim 10, wherein said embryo is a stage X chicken embryo.

12. The method of Claim 1, which further comprises:

(iv) transfecting or transforming the resultant EG cells with a desired nucleic acid sequence.

13. The method of Claim 12, wherein said nucleic acid sequence encodes a therapeutic polypeptide.

14. An improved method of producing chimeric avians which comprises:

(i) isolating primordial germ cells from an avian;

(ii) maintaining such PGCs in a tissue culture medium containing at least the following growth factors;

(1) leukemia inhibitory factor (LIF),

(2) basic fibroblast growth factor (bFGF),

(3) stem cell factor (SCF) and

(4) insulin-like growth factor (IGF) for a sufficient time to produce embryonic germ (EG) cells;

(iii) transferring said EG cells into a recipient avian embryo; and

(iv) selecting for chimeric avians which have the desired PGC phenotype.

15. The method according to Claim 14, wherein said PGCs are derived from avian embryos of the genus *Gallinacea*.

16. The method according to Claim 15, wherein said avian embryos are turkey or chicken embryos.

17. The method according to Claim 14, wherein said EG cells are transfected or transformed with a desired nucleic acid sequence prior to transferral to a recipient avian embryo.

18. The method according to Claim 17, wherein said nucleic acid sequence encodes a therapeutic polypeptide.

19. The method according to Claim 18, which further includes purifying said therapeutic polypeptide from the eggs of the chimeric avians produced according to step (iv), or the systemic circulating system or body fluids or tissues.

20. The method according to Claim 14, wherein the PGCs are injected into the dorsal aorta of a recipient avian embryo or into recipient blastoderms.

21. An avian EG cell line obtained by the culturing method of Claim 1.

22. The cell line of Claim 21, which is a chicken or turkey EG cell line.

23. The cell line of Claim 21, which contains an inserted nucleic acid sequence.

24. The cell line of Claim 22, which is P102896.